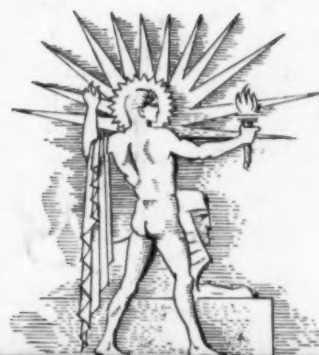
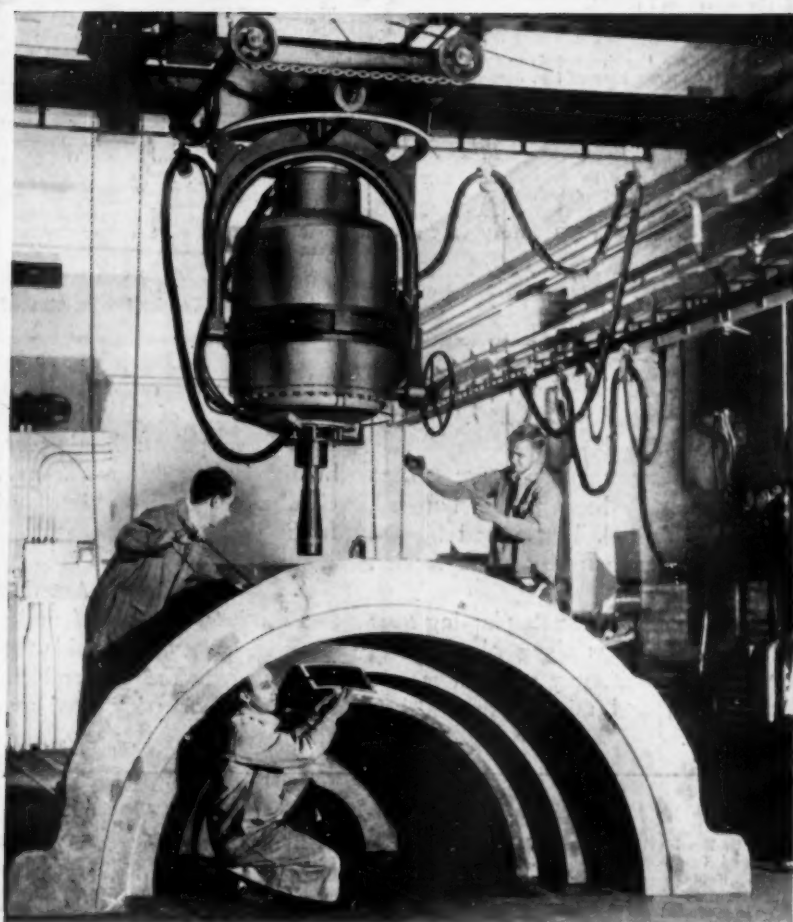


PRTECHNOLOGY DEPT
15¢

SCIENCE NEWS LETTER

PUBLIC LIBRARY
NOV 25 1941
DETROIT

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



November 22, 1941

Looks Through Steel

See Page 330

A SCIENCE SERVICE PUBLICATION

Do You Know?

Potato flakes are to be manufactured in Sweden as a substitute for bread grain.

Catafighter is a British popular name for a fighter plane launched by catapult from merchant ships.

By an improved process, *carotene* can be recovered from alfalfa-leaf meal either as crystals or a vitamin A concentrate.

Special *flashlights* for night traffic control of U. S. Army convoys have a red light for normal night conditions and a blue light for blackouts.

Earliest attempts to produce *silk* in the New World were made by Cortes who brought silkworms and mulberry seeds to Mexico in 1522.

Ancient Rome's streets were so narrow and crowded that carts were mostly forbidden to use the streets by day, so that nights were noisy with traffic.

A special clinic to help remedy *facial deformities* has aided 25 severely handicapped persons in a year at the University of California College of Dentistry.

Welsh people are descendants of the *Celts* of ancient Britain, and their language today would probably be fairly well understood by a Briton of 2000 years ago.

Now that the *cyclotron* is producing radioactive elements for treating disease, the University of California Medical School is giving a cyclotron course to medical men.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.

ANTHROPOLOGY

What does a new-found prehistoric skeleton tell scientists about the living of Hopewell Mound Builders? p. 335.

BACTERIOLOGY

Where has a germ-killer more powerful and safe than the sulfa drugs been found? p. 325.

ENTHNOLOGY

Where do young couples always live with the bride's folk? p. 329.

GEOLOGY

In what state is mercury being mined for the first time? p. 331.

HORTICULTURE

How can the vitamin content of vegetables be increased? p. 334.

MEDICINE

How does the draft-dodger among aviation recruits betray himself? p. 326.

How was a girl whose throat was closed by lye burns enabled to drink? p. 323.

What is the matter with the health of airline pilots? p. 326.

What test may be used in selecting pilots for dive bombing? p. 326.

What vitamin may protect syphilis victims from dive poisoning in the treatment? p. 325.

METALLURGY

How can the Government's hoard of silver be put to use? p. 332.

NUTRITION

What experiment will entitle U. S. troops to the name "limey"? p. 324.

What food essential is being extracted from walnut shells? p. 328.

OCEANOGRAPHY

Where do waves rise to over 65 feet? p. 329.

How are X-rays now aiding defense? p. 330.

PHYSICS

What is the principal ingredient of glass? p. 329.

What makes the floor of the stratosphere wave up and down? p. 324.

Who added new blue to Morningglory Pool? p. 327.

PSYCHIATRY

What suggestion has been made for bringing the world back to sanity after the war? p. 327.

PUBLIC HEALTH

How widespread is the parasite that causes amebic dysentery? p. 328.

Why is the poppy seed trimming on your rolls doomed? p. 328.

RESOURCES

What is the most universally used plant that grows? p. 328.

WILDLIFE

What kind of eagles live in Alaska? p. 333.

A section of the Roman *catacombs* has become an air raid shelter.

One lighting company tests 20,000 *lamps* a year by having them bumped, pounded, dropped, beaten and burned out to exaggerate treatment in service.

A tree grower advocates planting *trees* in irregular groups along highways to lessen glare—uniformly spaced trees are monotonous, and might induce driver drowsiness.

Complete *air conditioning*, according to University of Illinois engineers, involves five points: heating or cooling, humidifying or dehumidifying, cleaning, circulating the air, and introducing some fresh outside air.

A way of "milking" American *skunks* and muskrats has been found at a New York laboratory, to provide the perfume industry with fixatives or blending substances replacing imported musk, civet, ambergris, and castoreum.

SCIENCE NEWS LETTER

Vol. 40 NOVEMBER 22, 1941 No. 21

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N. St., N. W., Washington, D. C. Edited by WATSON DAVIS.

Subscriptions—\$5.00 a year; two years, \$7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

In requesting change of address, please give your old address as well as the new one, at least two weeks before change is to become effective.

Copyright, 1941, by Science Service, Inc. Reproduction of any portion of SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service.

Cable address: Scienserve, Washington. Entered as second class matter at the post-office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed

form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and in the Engineering Index.

The Science Observer, established by the American Institute of the City of New York, is now included in the SCIENCE NEWS LETTER.

Members of the American Association for the Advancement of Science have privilege of subscribing to SCIENCE NEWS LETTER, at \$3 a year. The New York Museum of Science and Industry has elected SCIENCE NEWS LETTER as its official publication to be received by its members.

Advertising rates on application. Member Audit Bureau of Circulation.

SCIENCE SERVICE is the Institution for the Popularization of Science organized 1921 as a non-profit corporation.

Board of Trustees—Nominated by the American Association for the Advancement of Science: Henry B. Ward, University of Illinois; Edwin G. Conklin, American Philosophical Society; J. McKeen Cattell, Editor, Science. Nominated by the National Academy of Sciences: R. A. Millikan, California Institute of Technology; Harlow Shapley, Harvard College Observatory; William

H. Howell, Johns Hopkins University. Nominated by the National Research Council: Ross G. Harrison, Yale University; C. G. Abbot, Secretary, Smithsonian Institution; Harrison E. Howe, Editor, Industrial and Engineering Chemistry. Nominated by the Journalistic Profession: O. W. Riegel, Washington and Lee School of Journalism; A. H. Kirchhofer, Buffalo Evening News; Neil H. Swanson, Baltimore Evening Sun. Nominated by the E. W. Scripps Estate: Frank R. Ford, Evansville Press; Warren S. Thompson, Miami University, Oxford, Ohio; Harry L. Smithon, Cincinnati, Ohio.

Officers—Honorary President: William E. Ritter, President: Edwin G. Conklin. Vice-President and Chairman of Executive Committee: Harlow Shapley. Treasurer: O. W. Riegel. Secretary: Watson Davis.

Staff—Director: Watson Davis. Writers: Frank Thone, Emily C. Davis, Jane Stafford, Marjorie Van de Water, Morton Mott-Smith. Science Clubs of America: Joseph H. Kraus, Margaret E. Patterson. Photography: Fremont Davis. Librarian: Minna Gill. Business Manager: Alvin C. Stewart. Sales and Advertising: Hallie Jenkins, Austin Winant. Correspondents in principal cities and centers of research.

MEDICINE

Rare Operation Gives Lye Burn Victim Artificial Esophagus

16-Year-Old Girl Swallows Water and Other Liquids Directly Into Stomach for First Time Since Age of Two

A 16-YEAR-OLD girl, Louise Dodson of Baltimore, whose esophagus was closed by lye burns when she was a baby, is swallowing water and other liquids directly into her stomach for the first time in 13 years as a result of an operation which has only once before been successfully performed in the United States.

The operation, or series of them, which gave Miss Dodson an artificial esophagus to carry food and water from her mouth to her stomach was reported by Dr. John Staige Davis and Dr. Edward S. Stafford, of the Johns Hopkins Medical School, at the meeting of the Johns Hopkins Medical Society.

To make the artificial esophagus, Dr. Davis devised a new method of creating a tube of skin by rolling together skin from her chest and covering it with more skin grafted from her back and flanks. This skin tube runs in front of her chest from her left collar bone almost to her stomach. It lies outside of her ribs but beneath the skin, so that, with the graft method specially devised to reduce scarring and deformity, Miss Dodson's appearance is not marred by her artificial esophagus.

The skin tube is connected at the upper end to the remaining natural esophagus. At the lower end it is connected with the stomach by a segment of jejunum, which Dr. Stafford cut out of its place in the small intestine. After sewing together the remaining pieces of intestine, the segment of jejunum was brought carefully up inside the abdomen to the end of the stomach near the heart and there one end was attached to the stomach. The upper end of this segment of intestine was brought through the abdominal wound, drawn beneath the skin of the abdomen and sewed to the lower end of the skin tube Dr. Davis made.

The connecting link between the skin tube and the stomach was made from jejunum, instead of skin, Dr. Stafford explained, because the tissues of this part of the intestinal tract can stand the acidity of the stomach juice far better than does skin.

Construction of the artificial esophagus was delayed until Miss Dodson had reached her full growth, because no one knew whether an artificial esophagus would grow in length as its young owner grew taller. From the time in 1928 when she swallowed a quantity of lye, at the age of two years and 11 months, until last month (Oct., 1941), Miss Dodson had lived entirely on food poured through an artificial mouth cut into her stomach. Most of this time was spent at the hospital or at Happy Hills, a convalescent home near Baltimore. She has spent a total of 2,036 days, or five years and nine months, in the Johns Hopkins Hospital, and has had a general anesthetic, usually ether, on 67 occasions.

Cost to the hospital of her care to date has been \$9,912.

During the first year or two following the swallowing of the lye, Miss Dodson had pneumonia repeatedly, twice with empyema. This was because saliva, which could not be swallowed into the stomach, would get sucked into her lungs. During this period, although she was being fed through the tube into her stomach-mouth, she gained no weight for nearly 18 months.

Convinced that Louise's esophagus would never again be useful and that she could not survive many more attacks of pneumonia, Dr. Davis began the long series of operations which have resulted in the successful artificial esophagus reported upon. First step was the cutting of a hole between the upper end of her esophagus and the skin of her neck through which saliva and fluid swallowed was expelled. After this Miss Dodson, then not quite five years old, began to gain weight rapidly and had no further attacks of pneumonia.

Only other successful case of complete reconstruction of an esophagus reported in American medical literature was performed in 1934 by Dr. Alton Ochsner,



FLYING SHIP

This is the first of a fleet of four-engined flying ships built to carry passengers non-stop across the Atlantic for American Export Airlines. The ship, which has a wing-span of 124 feet, is expected to have a top speed of 235 miles per hour, cruising speed with full load of 175 miles per hour, maximum range of over 6,000 miles. It will carry 40 passengers.

of New Orleans, but this patient unfortunately died four months later from another cause. Several successful cases have been reported in Europe since 1894.

Need for the operation is not so frequent now, because present treatment following severe lye burns of the esophagus is far superior to what it was in 1928 or earlier. Doctors now

start passing bougies or buckshot down the esophagus almost as soon as it has been burned, to keep it from being closed by scar tissue. When Miss Dodson had her burn, her family doctor treated her with a mixture of lemon juice and vaseline. The ulcerations of her mouth and throat healed under this treatment but it failed to keep her esophagus open.

Science News Letter, November 22, 1941

PHYSICS

Low Boundary of Stratosphere May Shift Up and Down

Daily Variations in Solar Radiation Thought To Cause Changes in Height Over Tropics Which Travel in Waves

THE floor of the stratosphere (scientists have a name for it: tropopause) may shift up and down from day to day, in response to daily variations in the sun's heat. This in turn may have far-reaching effects on world weather, (See Review, SNL, this issue).

Indications that fluctuations in the tropopause are influenced by solar radiation changes have been brought out in

researches of Dr. Henryk Arctowski, noted Polish meteorologist now working at the Smithsonian Institution.

The occurrence of daily fluctuations in the sun's heat was established as a fact long ago, by Dr. Charles G. Abbot, secretary of the Smithsonian Institution. Scope of these variations is frequently as much as one half of one per cent, and occasionally much more than that.

These variations occur in a complex series of cycles.

If the earth were without an atmosphere, like the moon, changes in solar heat would be felt immediately at the earth's surface. But the sun's heat has to pass through a hundred-mile blanket of air to reach the ground, so that its effects are delayed and complex. Winds, clouds and other factors all have far-reaching effects in the distribution of radiations coming to us from the sun.

At some place, however, it is necessary to look for direct effects of solar radiation. According to Dr. Arctowski, the most probable place is the tropopause—the level where temperature decrease with altitude comes to an end.

His researches indicate, the Polish scientist states, that solar radiation variations cause changes in the height of this surface over the tropics, where it normally is about 12 miles high, and that these changes proceed northward and southward in a wave-like motion.

An up-and-down movement of the tropopause, in turn, causes a variation in the height of the highest clouds, and in the movements of air masses. These in turn produce different rainfall effects in various parts of the earth.

Science News Letter, November 22, 1941

NUTRITION

U. S. Troops On Maneuvers To Be "Limeys" in Test

U. S. Army "limeys" will have an experimental bout of limeade drinking, when the First Army's soldiers come to grips with the Second Armored Division in Carolina maneuvers in December.

Quartermaster Corps headquarters explains that American soldiers have become accustomed to pitchers of lemonade with some meals, particularly in warm climates. The Florida market offers few lemons, but has a lime crop. So, it will be limeade on the menu for some troops, and if the boys like it, there may be more of it, when and where available.

British sailors long ago won the nickname "limey" when citrus fruits were discovered to be a scurvy cure on ship-board. Incidentally, food historians explain that lemons were often called limes then, and the original limeys were lemon-eaters. Modern nutritionists say that fresh lime juice is apt to be slightly less rich in vitamin C than lemon juice, although in some cases it may be as high.

Science News Letter, November 22, 1941



LIMES FOR U. S. SOLDIERS

BACTERIOLOGY

Cannibal Mold More Powerful Germ-Killer Than Sulfa Drugs

Penicillin, Substance Extracted from Mold, Also Does Its Germ Killing Without Harm to Body; Not Plentiful

By DR. CHARLES HILL

Deputy Secretary, British Medical Association

FOR most human beings the age of cannibalism is over. But not so with microbes. One eats another with the careless abandon of a vegetarian tucking into his beans. This cannibalism amongst microbes has led to a discovery by British scientists of profound importance to doctors and patients the world over. The story is found in the recent issues of two British medical journals. It opens some years ago in the bacteriology department of one of London's largest teaching hospitals, St. Mary's.

Prof. A. Fleming was engaged in his daily routine work in his bacteriology laboratory. He was growing colonies of different germs on specially prepared plates. One of his plates he noticed was contaminated by a mold, not unlike the molds that grow on stale bread or cheese or sausages. This too is a common occurrence in a laboratory, for one of the most difficult tasks is to grow germs pure and uncontaminated.

Most of us would have removed the mold and started again, but Professor Fleming went one better. He allowed the mold and germ to remain on the plate, only to find that while the mold was there the germ would not grow. In fact the mold killed the germ. This was the first, indeed the fundamental, discovery—if the microbe did not eat its fellow microbe it certainly killed it.

Exploited Un-Neighborliness

The professor pursued the matter further. He discovered that it was only some germs which found it impossible to live side by side with the mold. So whenever he wanted to get rid of one of the germs he knew the mold could not live with, he added some mold to his plates. He exploited their known un-neighborliness.

So far the discovery was interesting, but not of great importance. Then came the suggestion that this mold, Penicillium, might be used to kill germs which were actually in the human body. Could

not the germ-killing substance which Penicillium contains be used as an antiseptic to kill germs inside the human body?

Prof. Florey of Oxford University headed a team of workers to tackle this problem.

After many experiments they succeeded in extracting from the mold the substance in it which possesses the antiseptic quality. From the mold Penicillium they extracted the germ-killing substance penicillin. This done, further experiments soon showed that penicillin was the most powerful germ-killer both inside and outside the body, superior even to the latest drugs. That is saying a great deal, for in recent years medical science has made enormous strides in antiseptic drugs.

One in Million Dilution Potent

Prontosil, sulfanilamide, M & B 693, sulfathiazol—already these new drugs all in the same big family have saved thousands of lives. In pneumonia, meningitis and in severe infections of many kinds they have been found to be immensely useful. But penicillin goes one better—it is both the strongest and the safest germ-killer yet discovered. It does its work even when diluted to the astonishing extent of one in a million. It can be given by mouth or injected directly into a vein. Most important of all, it kills the germ inside the body without harming the body itself. Its work of germ-killing done, it passes through the body into the urine, from which it can be extracted by the chemist and used again.

There is one snag. Although there are plenty of molds in this world, there is not enough Penicillium mold of the right kind to give us large quantities of penicillin. That difficulty may not prove insuperable. Research is now being undertaken to discover other sources of penicillin. Its chemical composition is being investigated in the hope that chemists may be able to manufacture it artificially in the laboratory.

We do well to remember that the value

of lemon juice in preventing scurvy was known before vitamins were ever heard of. But when it was found that lemon juice prevented scurvy because it contained vitamin C, the chemists got busy and made the vitamin artificially in their laboratories. Let us hope that the story of penicillin is the story of vitamin C. Hopes are very high. The *British Medical Journal*, known for its cautious attitude, has gone so far as to say that penicillin is to other antiseptics what radium is to other metals. In view of that praise it is not too much to say that St. Mary's Hospital, London, and the University of Oxford, have made a most important contribution to human knowledge.

Science News Letter, November 22, 1941

MEDICINE

Vitamin C May Improve Treatment of Syphilis

VITAMIN C, plentiful in your breakfast orange juice, may help prevent drug poisoning in patients under treatment for syphilis, Dr. Herman Bundesen, Chicago Health officer, Dr. Hans C. S. Aron, Dr. Regina S. Greenebaum, Dr. Arthur F. Abt, and Chester J. Farmer of Chicago, report. (*Journal, American Medical Association*, Nov. 15).

Experiments in which patients were tested with neoarsphenamine and mapharsen, the drugs most commonly used against syphilis, with and without the addition of Vitamin C, indicated that reactions to the drug may be prevented in the great majority of patients by use of the vitamin. Results in actual treatment of patients will be reported later, the physicians state.

A dramatic method of study was developed—the "patch test." Patches, soaked in drug solutions to which vitamin C was added, were applied to the skin of patients known to be sensitive to the drugs. No reaction followed. At the same time, patches soaked in drug solution alone were applied. The usual skin reaction followed. These were the first demonstrations of the protective action afforded human skin by vitamin C against arsenical drug poisoning.

The Chicago doctors believe that by keeping the blood level of vitamin C sufficiently high, physicians may use the anti-syphilis drugs much more safely, except in special cases which are in the minority. Some physicians believe the vitamin C treatment may be useful in the so-called "five-day treatment" for syphilis in which massive doses of the arsenical drugs are used.

Science News Letter, November 22, 1941

MEDICINE

Physical Defects Found in Large Percentage of Pilots

Although Not Disabled, 71 Out of 103 Transport Pilots Had Ills That Could Affect or Were Affecting Health

A LARGE percentage of transport pilots who believe they are in good health and have passed the Civil Aeronautics Authority examinations have physical defects that may affect their health and even endanger their own and their passengers' safety. Evidence for this appeared in a report by Dr. Jan H. Tillisch and Dr. W. Randolph Lovelace, of the Mayo Clinic, to the Aero Medical Association meeting in Boston.

In a group of 103 transport pilots examined by these doctors, "71 had physical defects which could affect or were affecting their general health," the Mayo Clinic doctors reported.

Infections of tonsils, teeth and sinuses, which if untreated might cause enough hearing loss to ground the pilot, were discovered in these men who did not think they were in need of medical attention. Some slight impairment of hearing was discovered in 41 of the 103 aviators.

Active duodenal stomach ulcers, only one of which had been previously diagnosed, were discovered in five of the men. This means that four if not five of these men were in danger of serious illness and invalidism and even of sudden hemorrhage and fainting while at the controls of their planes.

One man had undiagnosed cancer of the bladder. Another had kidney stones. The reason these physical defects were not discovered during the CAA examinations, it was pointed out, is because the CAA examination is designed primarily to determine the pilot's immediate physical ability to fly, not to determine the state of his general health.

Science News Letter, November 22, 1941

Autogiros for Wounded

AUTOGIROS as well as large ambulance transport planes may play a part in evacuating war-wounded, it appears from a report by Dr. Lovelace and Major John Hargreaves, U. S. Army.

The autogiro companies claim, these doctors reported, to have a plane capable

of a jump take-off which will carry two litter patients, an attendant and a pilot.

Such a plane would be useful in evacuating wounded when suitable landing fields for large planes were not available and roads were blocked so that motor ambulances could not reach the loading points.

Experiences in the wars in Spain and Poland and in civil life show that the air transport of the sick and wounded is the method of choice, Dr. Lovelace and Major Hargreaves declared. Chances of recovery of seriously wounded men are improved because of the shorter time needed to bring them to base hospitals where major surgical and other procedures can be carried out. Morale is also improved by the knowledge that they will soon be getting more than hurried first-aid treatment.

Science News Letter, November 22, 1941

Test for Dive Bombing

A TEST which may be useful in selecting pilots who will be able to undergo prolonged rapid descents as in dive bombing without injury to their ears or hearing was described by Major Paul A. Campbell, of the School of Aviation Medicine, Randolph Field, Tex., to the Aero Medical Association.

The test depends on the ability of the eustachian tube, between the middle ear and the throat, to ventilate properly and thus carry on its important function of keeping air pressure on the inner side of the ear drum membrane the same as on the outer side.

Ability of the tube to ventilate can be determined, Major Campbell said, by determining the amount of pressure necessary to force it open during the act of swallowing.

If a flier cannot ventilate his eustachian tube properly, due to pharyngeal inflammation, anatomical deformity or other reason, loss of hearing for certain tones may result after extremely rapid changes in altitude. These losses of hearing are usually only transient, but may become

permanent if the "insult" to the hearing apparatus is repeated often enough.

Loss of hearing in the 4096 frequency area, the area of the highest note on the piano, may result from long periods of subjection to the noise of high powered motors, the whine of propellers combined with other noise inherent in the movement of aircraft. This loss of hearing may be only transient, but if severe enough or repeated often enough, it may become permanent, depending on the hearing apparatus the flier has inherited, past diseases of the ear, and the like.

From study of the hearing curves, as recorded by audiometers, of many fliers in the past few years, Major Campbell concludes that many of those who have flown thousands of hours have perfectly normal audiograms for their age group and "examination of their ear drums fails to give any clue as to their vocation or avocation."

Science News Letter, November 22, 1941

Have Distinctive Interests

IT IS the strongly "he-man" type of boy who goes into naval aviation, Commander Eric Liljencrantz, of the Navy's aeronautic medical research section, told the Aero Medical Association.

The interests of the boys who want to enter this field are so typical, he indicated, that a test of interests can be used to betray the draft evader or those with other ulterior motives rather than a genuine love of flying. Naval flyers are like men in skilled trades and the applied sciences in their interests. They have little in common with artists, lawyers or salesmen.

Increasing stress of service for the Navy's fighting flyers has produced a "crying need," for a new reliable measure of emotional stability, Commander Liljencrantz said.

In spite of the high physical standards of naval aviation, about a fourth of the men who meet them fail in flight training, he said. Personality defects may be responsible for many of these failures.

Tests of intelligence of a paper-and-pencil type are of little use at present in selecting naval aviation candidates, because the college education requirement already insures that these boys must have a high degree of intelligence. If this requirement were waived, however, the intelligence test would be very useful.

The pilot must be able to do much more than manipulate the controls of an airplane, Commander Liljencrantz said. Almost any healthy young person can be

taught to do this. Carrier and catapult operations, mass formation flights, protracted exacting missions and operations under adverse weather conditions or in darkness must be carried out. A Navy pilot must be able to cope with complex problems in navigation and to carry out exacting orders and make split-second judgments.

The Navy does not search for any Apollo-like, or movie-idol type of physical build in their aviators. Physical dimensions of aviators are limited by the

size of the cockpit, Commander Liljenkrantz indicated, and by good health and general Navy physical standards. Beyond that no relation has been found between the build of the individual and his success in flying.

But the best of physiological performance is none too good for the flyer, he said. The mechanical performance of airplanes now exceeds the limits of physiological performance of the men who must fly them.

Science News Letter, November 22, 1941

PSYCHIATRY

Board of Experts Proposed To Guide Men Back to Sanity

If Such a Group Had Been Employed Years Ago, Hitler Could Not Have Come Into His Power, Scientist Holds

TO BRING men back to sanity after this war, governments should officially employ boards of scientific experts in psychiatry, anthropology, and semantics, it is proposed by Director Alfred Korzybski, of the Institute of General Semantics.

If such a group of experts had been on duty years ago, Dr. Korzybski said, (*American Journal of Psychiatry*, September) they would have studied "Mein Kampf" which politicians did not then read or understand. They would have reported officially that a sick man was getting into power and could have predicted the consequences.

"With that enlightenment, those in power could have met the situation more intelligently, and thus avoided the unbelievable blunders such as appeasements. More than that: if such an inevitable diagnosis by government experts had been officially published, even the people under mentally sick rulers would

have refused to follow their leadership. The world is learning its lesson too late."

Anyone who studies hospitalized mental patients and their writings, Dr. Korzybski said, cannot miss seeing in "Mein Kampf" and the speeches of various Nazis a pathological use of language which completely disregards its proper use of conveying thought or information.

Such a "sick use" of language for deliberate distortions abolishes predictability and so breeds fears and anxieties among the people subjected to it.

When a new weapon like the magnetic mine appears, it is turned over as a problem to experts in physics and engineering. The "war of nerves," "war of verbal distortion," and "war of linguistic pathology" are also important problems for experts and should be referred, Dr. Korzybski indicated, to such a board of scientists as he proposed.

Science News Letter, November 22, 1941

PHYSICS

Outrageous Pranks Sparkle In Life Story of Prof. Wood

A NEGLECTED advantage of science is the tremendous amount of fun you can get out of it—provided you have a sufficiently lively imagination and not too many stilted inhibitions. This advantage has been realized to the full by one of the most notable of the world's leaders in physics, Prof. R. W. Wood

of the Johns Hopkins University, whose biography is just published, (*Reviewed SNL, this issue*).

Prof. Wood appears in this book, which comes out under the authorship of William Seabrook, as a veritable modern Faust, a figure growing into a legend even in his own lifetime, for his cease-

less fireworks-like eruption of brilliant experimental solutions of difficult problems, interspersed with equally brilliant outrageous pranks.

R. W. Wood showed how to produce a stream of atomic hydrogen, now the foundation of a non-oxidizing welding process. He performed the first experiments that eventuated in the present-day sodium vapor lamps. He devised a beacon-lamp using ultraviolet radiation, that enabled convoys to maintain formation at night while remaining invisible to the periscopes of submarines. He solved the riddle of the purple gold of Tutankhamen. He found a way to make cheaply the fine-ruled gratings that split sunlight into its spectrum. He did a thousand other similar feats—usually, legend declares, in about fifteen minutes per feat.

The same R. W. Wood set street idlers agape by apparently spitting fire into a rainwater puddle—the trick was done with a bit of metallic sodium. He kept cats off the back fence by planting sensitively explosive nitrogen tri-iodide on it. He carried a pint jar of blue dye all the way to Yellowstone Park (on his wedding trip, at that!) just to make Morningglory Pool bluer than it had ever been before, to the amazement of a flock of tourists who didn't see him drop it in.

He emulated Renaissance geniuses who dabbled in poetry on the side—but not too seriously. His two little classics, *How to Tell the Birds From the Flowers* and *Animal Analogues*, have passed through many editions. He carried on a ceaseless war against mediums and other frauds, showing them up mercilessly with tricks ever so much smoother than their own.

Past seventy now, and gray-haired, R. W. Wood is still a curiosity-driven, irrepressible boy.

Science News Letter, November 22, 1941

● RADIO

Wednesday, November 26, 3:45 p.m., EST

On "Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. Don W. Gudakunst, medical director of the National Foundation for Infantile Paralysis, will report on the infantile paralysis outbreaks of 1941 and tell of studies of cause of spread and methods of treatment of the disease.

Saturday, December 6, 11:45 a.m. EST

Sidney D. Kirkpatrick, editor of Chemical and Metallurgical Engineering, will discuss magnesium from seawater.

Listen in each later Saturday at 1:30 p.m.

Monday, December 1, 9:30 p.m., EST

Science Clubs of America programs over WRUL, Boston, on 6.04 and 11.73 megacycles.

One in a series of regular periods over this short wave station to serve science clubs, particularly in high schools, throughout the Americas. Have your science group listen in at this time.

PUBLIC HEALTH

**Cause of Amebic Dysentery
Plagues All the Americas**

AMEBAE, tiny parasites that cause amebic dysentery, menace the health of the Americas from Saskatchewan, in Central West Canada, to the Straits of Magellan, it appears from evidence presented by Prof. Ernest Carroll Faust, of Tulane University of Louisiana School of Medicine, to the American Society of Tropical Medicine meeting in St. Louis.

In the United States as many as two out of every 10 persons may have amebae in their bodies, Prof. Faust estimates. This figure is twice as high as previous estimates which put the amount of amebic infection in the United States at 10%. Amebic infection is much more intense in the American tropics than in the temperate zones, but it is not, as once was believed, exclusively a tropical health menace.

Not every person who has amebae in his body has symptoms of acute or chronic amebic dysentery. The symptomless carriers, however, are in danger of becoming acutely or chronically ill, and they constitute a source of infection for others in their communities.

"Today the important problem in amebiasis is the specific diagnosis of the infection," Prof. Faust declared, emphasizing that accurate diagnosis is essential both for treatment of individual patients and for eventual development of methods to control or prevent the infection.

Science News Letter, November 22, 1941

RESOURCES

**Bamboo Plant Provides
Many Essential Materials**

WHAT is the most universally used plant that grows? Is it, as many have stoutly maintained, the coconut palm? Or sorghum, maize, sugar cane, or peanut?

No, not one of these, according to Dr. William M. Porterfield, Jr., of the U. S. Soil Conservation Service. It is bamboo.

There is not a category of human needs which cannot be supplied by some form or product of bamboo, declares Dr. Porterfield. Food, weapons, shelter, baskets and containers, bridges, conduction pipes, paper, cable, ornaments, and many very specialized articles are made from it.

The Forest Research Institute at Dehra Dun in India believes that the final solution of the world's recurring shortage of raw material for paper will only

be found in the forest and waste lands of the tropical and subtropical belts, with bamboo the most important product.

Bamboo has figured largely in the past history of Asiatic and many tropical peoples and has been the subject of artistic rendering in all the arts. The famous Bamboo Books, containing more than 100,000 seal characters, comprising fifteen different works dealing with the history of China for 2,200 years, were written on tablets made of bamboo which were strung together like a fan.

To bring the uses of bamboo up to date, a bamboo basket has been designed and used by the Chinese to protect their most important buildings from Japanese air raiders. According to W. R. Peck, Counsellor of the United States Embassy, Chungking, China, the Chinese construct a three-story bamboo framework atop buildings and load all three floors with cut bamboo. When a bomb hits it is harmlessly detonated before it reaches the building itself.

Science News Letter, November 22, 1941

PUBLIC HEALTH

**Poppy Seed Roll Trimming
Likely Soon to Vanish**

POPPY seed trimmings for rolls are likely to vanish from American dinner tables. The new California law making it illegal to grow any poppy that can yield opium is expected to have a nation-wide follow-up. The Treasury's Bureau of Narcotics has already recommended passage of federal legislation.

The United States used to import poppy seed as roll trimmings by thousands of tons, and at such a low price as eight cents a pound. When higher duty boosted the price, American growers began to take interest.

Discouraging American poppy seed production, narcotic officials explain that while there might seem no harm in growing the seed for bakeries, there is grave danger that racketeers would get hold of the poppy plants for opium.

Plowing under, and destroying with supervision, many acres of peony and carnation poppies planted for seed, California growers this season conformed to the new state law, and at the same time were allowed to salvage a seed harvest if they could. Any carry-over stocks of seed have been "cooked" and sold to bakers.

Some poppy seed is being produced in other states. When federal law stops that — well, said one narcotic official cheerfully, after all there are plenty of other roll trimmings.

Science News Letter, November 22, 1941

IN SCIENCE

ANTHROPOLOGY

**Geologist Predicts
Long Life For Race**

IGNORING war's turmoil, Harvard University's professor of geology, Dr. Kirtley F. Mather, launches the cheerful prediction that the human species probably has a 500,000-year future and that the earth's resources are bountiful enough to keep mankind going for millions of years.

No need to worry that man's specialization in brains will be his downfall, as the dinosaurs' specialized bony armor plate is supposed to have helped along their extinction, Dr. Mather declares, giving his views on "The Future of Man" in the Annual Report of the Smithsonian Institution. Man needs to act with more intelligence, and to increase his ability to see in advance the remote consequences of contemplated action, the geologist concludes.

If *Homo sapiens* is an average species of the earth's creatures in longevity, the human race that now rules the earth is still young, with a mere 50,000 years to its credit. Our golden age, if any, is in the future, Dr. Mather foresees. After a half million years more of existence, our type of mankind may either exit via a blind alley or develop into a descendant species better adjusted to environment than we are.

Science News Letter, November 22, 1941

NUTRITION

**Russians Get Vitamin C
From Walnut Shells**

WALNUTS may be one source of vitamin C available to Soviet Russia, as a result of experiments which were reported successful recently.

The Institute of Biochemistry at Moscow announced that the soft outer shell of unripe walnuts contains a large supply of this vitamin, which can be extracted and robbed of its bitterness and reduced to a vitamin concentrate.

Since walnuts grow abundantly in Soviet areas, the new process, described as simple, was expected to yield large quantities of vitamin C.

Science News Letter, November 22, 1941

NE FIELDS

ETHNOLOGY

Cow Creek Seminole Groom Lives With Wife's Folks

DECIDING whose relations to live with is no arguing problem for newly-weds in Cow Creek Seminole circles. A bridegroom invariably moves over to his wife's folks and builds her a home in the midst of her family camp, according to Dr. Alexander Spoehr, ethnologist of the Field Museum of Natural History, who has been studying these Florida Indians.

To obtain first-hand facts about the lives of the Cow Creek tribe, Dr. Spoehr spent several months on the Brighton Reservation, living Indian style and fraternizing with members of the five principal clans of the tribe—known as Panther, Bird, Deer, Snake, and Tallahassee clans.

Social structure of this tribe builds families and clans around mothers, sisters, and wives rather than around breadwinning males, Dr. Spoehr reports in "Camp, Clan and Kin among the Cow Creek Seminole of Florida" (*Reviewed, SNL*, this issue). Unmarried men live in the camp of their sisters or mothers.

A married couple that fails to "get along" is simply divorced if the husband packs his few possessions and moves out. The children stay with mother, and there is no alimony.

Science News Letter, November 22, 1941

OCEANOGRAPHY

California Gulf Has Giant Internal Waves

ALTHOUGH surface waves that crash on beaches and lift ships high on the open sea are majestic and spectacular, they are mere froth compared to underwater waves in the Gulf of California. This is the conclusion of W. H. Munk after scientific investigation and calculations.

Dr. Harald U. Sverdrup of the University of California's Scripps Institution of Oceanography suspected the rolling of giant under-sea waves after a survey completed in 1939. In a cruise of the "E. W. Scripps," floating laboratory of the In-

stitution, calculations were made of density, temperature, and salinity from data gathered at fifty-three oceanographic stations on the California Gulf. Dr. Sverdrup suggested his theory to Mr. Munk, who is connected with the California Institute of Technology, and turned over the data for study.

Mr. Munk found Dr. Sverdrup's theories substantially correct, and estimates that the internal waves are about as large as one-tenth the depth of the Gulf itself, which is over 650 feet. So massive are these sea-bottom swells, and so slowly do they move that the lapse of time between the passage of one crest to the arrival of the next over a given point takes from six to seven and one-half days.

"What causes this phenomenon is not yet clear," said Mr. Munk. "It may be due to the effect of the tides, but that theory will bear further investigation."

Science News Letter, November 22, 1941

AGRICULTURE

Special Kind of Silage Makes Chickens Thrive

SILAGE has been fed to cows for more years than most of us remember, but it is only now that chickens begin to get the benefit of this way of feeding.

It doesn't require a huge first cost in a silo. A 50-gallon barrel is all that is needed. At the University of Tennessee, experiments with this feed have yielded good results, both in increased egg production and rate of growth.

The silage is made of chopped-up legume hay, such as clover, and cowpeas, cut in the fresh bloom stage. Immediately after being cut it is chopped into half-inch lengths. With each 100 pounds of silage is added enough sour skim milk or powdered buttermilk dissolved in water, to make the mixture moist. In some cases black-strap molasses dissolved in water is used. Another way is to mix with each 100 pounds of chopped-up legume hay 8 or 10 pounds of crushed carrots, or 8 or 10 pounds of sweet potatoes, or 20 or 30 pounds of corn in dough stage, or any one of several fruits, vegetables or field crops.

In the feeding tests one flock of young stock fed silage and mash gained 214% in ten weeks, compared with 166% for a check flock given mash alone. Another flock fed skim milk and mash gained 215%, but the advantage in favor of silage is that it is a cheaper feed than milk. A flock fed silage laid 30.5% more eggs than one that didn't get it.

Science News Letter, November 22, 1941

PHYSICS

Glass Is Mostly Gas, X-Ray Studies Reveal

GLASS, so hard and brittle, is mostly composed of the gas we breathe to keep alive; 92% of its volume is occupied by oxygen atoms, to which also 95% of its light-bending power is due. These and other facts concerning the formation of glass were revealed by X-ray studies, Dr. Alexis Pincus, research scientist of the American Optical Company, declared in an address to the Ceramics Club of Rutgers University.

Only one per cent of the glass volume is occupied by the atoms of silicon—the chief component of sand—but it is this small quantity of silicon, Dr. Pincus continued, that imprisons the oxygen and makes it form glass.

Other elements have this power too, Dr. Pincus disclosed; for example, boron, phosphorus, antimony, tantalum, tungsten, germanium and columbium. Glasses based on some of these elements have been made, he said, and for special purposes are superior to glasses made with silicon.

Science News Letter, November 22, 1941

ZOOLOGY

Army Private Takes "Bugs" From Dead Toads to Camp

BECAUSE First Class Private Stanley Stewart took tiny "bugs" from dead toads in his baggage to Camp Lee, Private Stewart is now credited with making an important science discovery.

The microscopic germs, which Private Stewart brought to Washington on glass slides to the Smithsonian Institution when he got his first Army leave, prove to be a germ unknown to science. Toads, which rate as a friend of farmers, have been vanishing rapidly throughout the states, and scientists say that perhaps the new-found germ is one major reason for dwindling toad population.

Private Stewart, a medical technician in pre-Army days, was attracted to the toad germ mystery when he noted droopy toads, that did not hop, and that when touched would topple over, jerk a little, and die. Dissecting them, he discovered tiny germs that loomed up like leatherback turtles under a strong microscope. These were buried in toad stomach linings, causing peritonitis.

Private Stewart has taken his "bugs" to Johns Hopkins University in Baltimore for a further check-up.

Science News Letter, November 22, 1941

PHYSICS

X-Rays Speed Defense

From Cancer Hospitals, Million-Volt Compact Machines Go to Factories Where They "Look" Through 5-Inch Steel

By JAMES STOKLEY

See Front Cover

X-RAYS of 1,000,000 volts are helping America's defense.

Great industrial plants, building huge machinery, have installed equipment to produce these penetrating rays. Steel castings five and six inches thick can be examined as if they were made of glass. Holes inside the castings, and other defects which might mean the failure of a vital part in a warship, a tank or airplane, are found and remedied before they can do any harm.

Only a few years ago 1,000,000-volt X-rays were not in existence. Then elaborate equipment was developed to produce them, and installed in a few hospitals for cancer treatment. But the rugged surroundings of a foundry are quite a different matter from the hospital laboratory. X-rays of lower power had already shown their industrial value. Thick metal parts, however, required X-ray exposures of many hours, far too long to permit a routine examination of the product of a foundry working in high gear.

A giant X-ray outfit, with its 1,000,000 volts, does the work of \$90,000,000 worth of radium, and costs only \$40,000.

The 1,000,000-volt unit was made smaller and simpler. It weighs 1500 pounds, about a third that of its immediate predecessor. This may not seem very portable, but it is nothing in a plant equipped with cranes for hauling 40-ton castings around. The 1,000,000-volt outfit is just as portable, in relation to the material it works on, as the little X-ray equipment in your dentist's office, with which he detects cavities in your teeth.

Two Units for Navy

Two of the new units are going to the U. S. Navy, for the yards at Philadelphia and at Norfolk. The Ford Motor Co., at Dearborn, Mich., Babcock and Wilcox, at Barberton, Ohio, Combustion Engineering Corporation, at Chattanooga, Tenn., American Steel Foundries, General Electric, at Schenectady, N. Y., have installed them, all for inspection of work in the

defense program. Another will soon be in place at the plant of the Campbell, Wyant and Cannon Foundry Co., at Muskegon, Mich., to inspect armament and motor castings which it will build for defense. And still other units are planned.

These 1,000,000-volt X-rays represent the latest stage in a series of researches extending back nearly half a century—back to the time that Prof. Wilhelm Konrad Roentgen discovered X-rays in 1895. His discovery came in the course of a research program dealing with electrical discharges in glass tubes from which most of the air had been exhausted.

Caused When Electrons Stop

X-rays, it turned out, are caused when electrons are suddenly stopped by a solid substance. They are like light waves, but many times shorter in length. In early tubes the electrons were torn out of the cold metal surface of one of the electrodes inside—the cathode. The X-rays were very erratic in behavior, because of the difficulty in controlling accurately the minute amounts of remaining gas. Then, in 1913, Dr. William D. Coolidge, at the General Electric Research Laboratory, invented the tube now almost universally used. Gas is almost completely removed. Electrons are supplied, not from a cold cathode, but from a small glowing filament, like that of an electric lamp. High voltage is applied as in the old tube, the electrons are pulled along, and thrown with great speed against a target of metal, usually tungsten, from which the X-rays radiate.

To get more and more penetrating X-rays, voltages were increased, but there proved to be a limit. If the voltage gets too high—up to several hundred thousand or more, much above that needed for ordinary medical X-rays—"field currents" appear in the tube. These are produced by electrons torn out of cold metal. They make the tube erratic, may even cause its destruction.

About a decade ago, Dr. Coolidge found that these field currents could be eliminated if the high voltage was applied in steps. Tubes were built in several sections, perhaps a hundred thousand volts being put in each one. If

there are five sections, with this voltage, after the electrons have passed all the way through, they will have as much energy as if 500,000 volts had been applied at once.

Using this principle, about five years ago, Dr. Coolidge and Dr. Ernest E. Charlton developed an outfit using 800,000 volts. It was made for a hospital, to give high-power X-rays for cancer treatment. The tube was 14 feet long and a foot in diameter. With its bulky high voltage generator, a special building had to be erected to house it. Certainly this was no unit for knocking around a factory.

Again research, under the direction of Dr. Charlton, head of the X-ray division of the General Electric Research Laboratory, solved the problem of simplifying the outfit.

The other day Dr. Coolidge, who is now vice-president in charge of research of the General Electric Company, paid tribute to him and his associates.

"The research work involved," said Dr. Coolidge, "occupied the full time of an average of six men for a period of four years, and this, starting of course not from scratch, but with full knowledge of the X-ray generating equipment of the prior art."

Two Developments Responsible

Two developments were mainly responsible for the new unit. Enclosed X-ray equipment had previously used oil in the casing to insulate the parts from the high voltages. Now it was found that Freon gas, developed for use in electric refrigerators and known chemically as dichlorodifluoromethane, could be pumped in under pressure and was more effective.

Also, a new type of transformer was designed by W. F. Westendorp. This is called the resonance transformer; it eliminates the iron core that normally forms the center of the coils of wire. With the core gone, the multi-section X-ray tube itself, 30 inches long and 3½ inches in diameter, was placed in this central position, an advantageous one making for compactness and shortening the electrical connections.

A metal extension of the tube projects two feet from the cylindrical tank which holds the entire equipment, and from its end emanate the X-rays. Some shoot straight ahead, as from a gun, others are



DEFECTS REVEALED

A million volt X-ray picture through several inches of steel looks like a fogged film but the white spray is due to defects in the steel.

sprayed to the side. Ordinarily the direct rays are used, but sometimes the side ones are convenient. The snout can be placed at the center of a boiler and radiographs, as the X-ray pictures are called, taken with a single exposure on a series of films all around the circumference.

The 1,000,000-volt outfit will photograph through five inches of steel in 2 minutes. A tube operating on 400,000 volts, the next size smaller, requires three and a half hours for the same job. Even then, the lower power picture does not show nearly as much detail in the thicker sections. In this way the new apparatus speeds inspection of parts for vital defense machinery, to be used on land, at sea, and in the air.

When a steel casting is found to have a defect, such as an inclusion of slag, the radiograph shows its position; the casting is sent back to the foundry and the defect is chipped out. Then new metal is welded in and the part is again X-rayed. If satisfactory, the construction of the machine is completed.

Even on smaller parts, high-voltage is a help, as the tube can back way from the job and spray a large area with the rays. Don M. McCutcheon, in charge of the X-ray laboratory at the Ford Motor Company, found, with a heavy part des-

tined for a large bombing plane, that at least six exposures were needed for each casting with 400,000 volts, while the 1,000,000-volt machine completely X-rayed six entire castings at once.

Million-volt X-rays were not developed because of the urgent defense activities, but their application has been speeded. A present-day parallel is seen in the way in which the last war made popular the general use of medical X-rays. Still some-

what of a novelty in 1914, doctors called to military service had to use them. They learned their advantages, and continued to use them in private practice after the war.

Now that many industries are being forced to use X-rays by the requirements of defense, they, too, will learn their value, and will keep on using them after the wartime rush is over.

Science News Letter, November 22, 1941

GEOLOGY

Idaho for First Time Enters Mercury Mining Picture

One Mine in Large-Scale Production, One Just Opened, Still Others in Prospect; Some Gold Found With It

MERCURY, vital defense metal, is now being mined on a large scale in Idaho, which until three or four years ago did not figure as a mercury-mining state at all, the U. S. Geological Survey states. One mine, in the Weiser deposits 50 miles northwest of Boise, is already in large-scale production. Another has just been opened, in another ore body some distance away, in the eastern part of the state. Still others are in prospect.

The Weiser ore body has been studied in detail by a Cornell University geologist, Prof. Alfred L. Anderson, who made the examination for the U. S. Geological Survey. His report has just been published by the Idaho Bureau of Mines.

This ore body, Prof. Anderson says, "was discovered in 1937. It aroused much interest, both because it is in an area not previously known to contain metallic lodes and because in the last two years of its operation it has brought Idaho into the list of states that contribute notably to the production of quicksilver."

Mercury is one of the vital defense elements, a key in any munitions program, being used in the detonators of all kinds of explosives, in scientific instruments essential to warfare, and also in drugs and antiseptics.

The United States has been a poor third to Spain and Italy in its production and since the beginning of the war has been cut off from a large part of its previous supplies imported from those countries. This curtailment has been reflected in the price of mercury, which has skyrocketed from \$1.60 to \$2.90 a pound.

The mercury occurs as cinnabar, a sulphide of mercury. This mineral is found impregnating siliceous, opalized rock which resembles red iron ore. The ore is mined from shallow excavations as well as from some subsurface workings and yields 5 to 15 pounds of mercury to the ton. After mining, the ore is ground and heated to drive off the quicksilver as a vapor. The vapor is then condensed by cooling to give the liquid metal.

Dr. Anderson says that the mineralized ground extends over more than 100 acres, but only a fraction of this has been thoroughly explored. He adds that some gold is found in the mercury, but the quantities are too small to be of commercial value.

Other states leading in the production of mercury are: California, Oregon, Texas, Arkansas and Nevada.

Science News Letter, November 22, 1941

CHEMISTRY—AGRICULTURE

Two New Plants To Make 20 Tons of Starch Daily

CARLOADS of cull white potatoes, a former waste product of farms, will be fed into two new starch plants which started operation in October in Idaho, thereby adding about 20 tons of starch a day to the nation's supplies and bringing \$280,000 a year of new wealth to farmers.

The plants, at Blackfoot and Twin Falls, will use about 19,000 tons of cull potatoes apiece in a year, paying a base price of \$3 a ton plus a bonus.

Science News Letter, November 22, 1941

METALLURGY

Silver May Substitute For Copper in Electrical Wiring

Metal Would Be as Safe in New Magnesium and Aluminum Plants as in Government Vaults and Would Aid Defense

SILVER, now lying idle in government vaults, could be economically substituted for copper in the electrical equipment of the new aluminum and magnesium plants now being built and thus help to relieve the present acute shortage of copper, declared Robert E. McConnell, chairman of the Engineers Defense Board, New York City, in an address to the American Institute of Chemical Engineers in Virginia Beach.

The Government owns 100,000 tons of silver, Mr. McConnell continued. Silver is an even better conductor of electricity than copper. It would cost very little to convert the government ingots into bus bars and wire.

The silver would be as safe as in the vaults. The plants will operate 24 hours each day. They will be guarded. Besides the wires will be alive all the time.

When the emergency is over the silver conductors can be replaced by the more conventional copper ones, and the silver put back into the vaults.

Twenty-five thousand tons of copper could be saved in this way in the new aluminum and magnesium plants, and another 50,000 tons could be saved in the same way in other plants requiring large conductors of electricity, Mr. McConnell stated.

"The shortage of copper will cause more inconvenience and dislocations

than will be caused by any other shortage," he said. It has become acute in the last six months and the prospects are that it will become worse. Recent estimates are that the total productive capacity of the Western Hemisphere south of Canada will be required for military purposes alone.

Current production of new copper in the Western Hemisphere is 1,600,000 tons a year, an all-time peak. Non-defense needs run about 1,000,000 tons a year. But 1,300,000 tons are wanted for defense, leaving only about one-fifth for the normal non-defense needs.

And for many uses there is no substitute for copper. Practically the only metallic substitute is steel. In some cases glass, plastics, wood or fabric can be substituted. Mr. McConnell believes that substitutions should be made wherever possible, and further that many economies can be made in the use of copper both in defense and in non-defense industries.

Science News Letter, November 22, 1941

Make Aluminum from Clay

UTILIZING a technique never before employed in metallurgy, a new process for the manufacture of aluminum from clay instead of the mineral bauxite, of which only about three years' supply remains in this country at the present rate of defense consumption, was announced to the American Institute of Chemical Engineers, by Prof. Arthur W. Hixson of the chemical engineering department of Columbia University.

The new process is expected to make this country independent of imports of foreign bauxite. It was developed at Columbia under the direction of Prof. Hixson, assisted by Ralph Miller and Ivan J. Klein.

All processes for the production of aluminum today use only high grade bauxite ores, Prof. Hixson declared. About 3,143,000 long tons will be required annually for the defense program alone. The total reserve in the United

States at the present time is about 11,000,000 long tons, according to geological estimates. Half of this has been imported. Without a method of using some other ore than bauxite, the United States would soon have to import all of its aluminum ore.

The new process uses selected high-silica clays, digests the clay with hydrochloric acid and decomposes the resulting product to get aluminum oxide. From this, the metallic aluminum is extracted by electrolysis in the usual manner. The hydrochloric acid is recovered for further use. The materials and chemicals used are abundantly available because they are by-products of other processes.

Science News Letter, November 22, 1941

After a number of failures to grow *Turkish tobacco* in Canada, a Turkish born Greek chemist reports success in western Ontario.



SCIENCE CLUBS OF AMERICA

Sponsored by Science Service

NEWS OF CLUBS

JACKSON, Mich.—The Jackson Junior Science Club of East Intermediate High School got a great kick out of its visit to the Ford Motor Company and the Ann Arbor Observatory last year and expects to be able to repeat the trips again this year. This group held a Science Fair and also produced an assembly program, both of which were so successful that similar events will become permanent features of this club's activities. Bertha E. Slye, Science Instructor, sponsors this club.

MOUNT OLIVE, Ill.—An extremely active group is the Research Science Club of Mount Olive Community High School. Under sponsorship of Sherman Sparks, Science Instructor, this group produces material which will be of permanent value to science classes in the school. In addition, the club sponsors and underwrites nine programs including a radio quiz; a play contest, in which original plays are produced; a health and conservation feature, and holds an Open House, at which projects and hobbies are displayed. A Chemistry Show, open to the public, is given every year. The club also holds a banquet for prospective new members in the spring.

LAS VEGAS, N. M.—Radio, photography and the building of models are the topics which interest members of the Phy Chy Science Club of Las Vegas High School. According to reports they are doing excellent work under sponsorship of Charles W. Wolfe, Science Instructor.

BROOKLYN, N. Y.—Members of the Radio Club of the Abraham Lincoln High School are engaged in the study of theories and in the construction of devices to fortify belief in those theories. Included also in the club's program is the building of novel electronic devices. This club is sponsored by William Marcus, Laboratory Assistant.

NEW YORK, N. Y.—The Biology Club of Julia Richman High School, under sponsorship of Frieda Lichtman, Biology Teacher, is engaged in the laboratory study of microscopic animals and the tissues of larger animals. At the present moment the members are actively engaged in preparing for the Science Fair held annually by The American Institute of the City of New York with which Science Clubs of America is closely cooperating. Up to \$3,000 in science grants is awarded annually for outstanding exhibits at this Fair which has become a national function of the Institute.

Don't Delay

getting that **new book** you want to read. **SCIENCE NEWS LETTER** will gladly obtain for you any American book or magazine in print. Send check or money order covering regular retail price (\$5 if price is unknown, change to be returned) and we will pay postage in the United States. When publications are free, send 10c for handling. Address:

Book Department

SCIENCE NEWS LETTER

1719 N St., N. W. Washington, D. C.

CLARKSBURG, Calif.—The County and State Fair will be enriched by exhibits from the Wheeler Science Club of Clarksburg High School. The members of this group are busy preparing assemblies, program material, science congress demonstrations, and are engaged in following various hobbies, including photography. The club is sponsored by Deane K. Smith, Vice-Principal and Science Teacher.

MERIDEN, Conn.—The Penturson Science Club which meets in the Y. W. C. A., under sponsorship of Mary I. Turner, retired teacher and tutress, is also affiliated with the Meriden Nature Club. Activities for the forthcoming year are now being discussed.

PROPHETSTOWN, Ill.—All places of scientific interest within a radius of 40 miles are covered by members of the Science Club of Prophetstown High School. Additional explorative work is carried on in the school laboratory. The club is sponsored by Ellen Smith, Science Teacher.

BLOOMFIELD, N. J.—Chemistry, astronomy and mineral collecting at present captivate the interests of the Junior Scientists of Bloomfield Junior High School. Andrew J. Peters, Teacher of Science, is the club's adviser. Members of this club decided upon the type of program they would like to follow and each week one or more of the members produces the subject matter decided upon at a previous meeting.

PHILADELPHIA, Pa.—Tagging frogs for science, studying water birds, and experimenting with sundews are among the amateur science activities reported in the October issue of the *Journal of the Philadelphia Council of Amateur Scientists*. A few copies can be made available to other areas upon application to W. Stephen Thomas, American Philosophical Society, 104 South Fifth St., Philadelphia, Pa., enclosing 10 cents to cover mailing costs.

Clubs are invited to become affiliated with SCA for a nominal \$2 for 20 members or less. You can become an associate of SCA for 25 cents, which includes a copy of the 128-page Science Handbook for 1942. Address: Science Clubs of America, 1719 N St., N.W., Washington, D. C.

Guinea Pig Soldiers Thrive on Blitz Ration

GUINEA-PIG soldiers fed on the Army's new light-weight blitz rations are actually in better shape after four days than their buddies in camp who go right on eating three square meals a day.

Hope of trying out the newly invented ration with an entire battalion is in prospect, says an enthusiastic report by Dr. Ancel Keys, University of Minnesota physiologist, who is taking a leading role in testing the compact food.

The problem of blitz rations for paratroopers and for delivery by air to troops engaged in mobile assault operations is not entirely solved, Dr. Keys says cautiously in a progress report to the *Quartermaster Review*. The ration is yet to be tested in tropical Panama and in Far Northern Alaska.

With the United States' agricultural wealth, he feels that the U. S. Army should have the world's best specialized ration of this tight-packed type that can be devised.

The ration, which packs about 2,000 calories of nutritive energy to a pound, could be packed as three meals of 1,200 calories each for combat troops, so that each meal would weigh 11 ounces including the packaging.

Special attention is being given to making the new ration tasty. A soldier in an armored division still has unarmored digestion, says Dr. Keys. So-called "pemmicans" made of mixtures including kidney knobs, shredded coconut, vanilla and other ingredients failed entirely as candidates for Army feeding. Troops and hired subjects simply could not take them when they tried to eat several successive meals—as they would have to do if isolated from base supplies with only the tight-packed rations to eat for days at a time.

Success has been achieved with biscuit formulas which include good concentrated meat products, with such added "dishes" as malted milk tablets and lemon powder to round out the meal. Stressing soldier psychology, Dr. Keys declares: "A ration that will not be eaten is worse than useless." Nausea might completely incapacitate men for duty. Variety is essential in these rations, the physiologist insists. Vitamins are important, but supercharging with vitamins "offers no advantage whatever."

Science News Letter, November 22, 1941



WITH you, as with us, defense comes first. Our output of optical instruments is being rapidly increased to meet the defense emergency. We will endeavor to give our customers the best service possible under existing circumstances, and ask your sympathetic cooperation.

Half a Glass Bead Says, "She'll Live"

HOUR by hour her temperature has risen while the doctor pits his skill and knowledge against the merciless infection. But now the blood count indicates that the infection has been checked. The crisis is past.

Such drama is a 1941 commonplace. Through the magic eye of the microscope, medical science has learned more of the nature of disease and its cure. Through "half a glass bead"—a tiny hemisphere of optical precision—science looks beyond superstition and ignorance, to see life processes at work.

With Bausch & Lomb's pioneer application of production methods, the microscope—a nineteenth century rarity—has become the twentieth century

working tool of medicine—of all science. And, paralleling its contributions to microscopy, Bausch & Lomb has served in many other branches of optical science. Today metallographs, photographic lenses, spectrographs, eye examining instruments, eyewear, binoculars, projection equipment, industrial research and inspection instruments—and scores of others—are available to science, education and industry.

BAUSCH & LOMB

OPTICAL CO. • ROCHESTER, NEW YORK

ESTABLISHED 1853

AN AMERICAN SCIENTIFIC INSTITUTION PRODUCING OPTICAL GLASS AND INSTRUMENTS FOR NATIONAL DEFENSE, EDUCATION, RESEARCH, INDUSTRY AND EYESIGHT CORRECTION

New Machines And Gadgets

Novel Things for Better Living

Did you ever notice that the top of a broom is shaped just like a dustpan? Then why not make the dustpan to fit over the top of the broom, with a sleeved handle to slide down the broomstick? Then you won't have to hunt all over for the dustpan when you have finished sweeping. It's right on your broom. All you have to do is to slide it off. Meanwhile it provides a firm backing for the broom while you are sweeping. But you are too late. The device has already been patented. Better luck next time!

Small disk-shaped fluorescent lamps that can be used in any sort of electric fixture in your home have now been patented. Fluorescent lamps have so far been used mostly in factories and offices because the long tubes, 18 to 48 inches, require special fixtures and may be inharmonious and harsh in some home surroundings. The small disk lamps, on the other hand, lend themselves to artistic requirements and give the more concentrated light required, for example, of a reading lamp. They can be made in sizes from 5 to 18 inches in diameter and $\frac{3}{4}$ to 2 inches thick. The 9-inch size corresponds to a 4-foot tube which consumes 40 watts and yields 1400 lumens of light—equivalent to a 100-watt incandescent lamp. The 18-inch lamp corresponds to four such tubes. The new lamps are claimed to be fully as efficient as the old and to burn 2000 hours.



Uphill drawing, like that shown in the illustration, is not so difficult as might seem. It is, on the contrary, much easier than drawing on a flat or slightly tilted table when the drawing is large. In that case the draftsman must sprawl all the way across the table to reach the farther edge, and draftsmen have been known to lie flat on their stomachs on top of the board to reach the far corners. This drawing board is hinged to the top of a good solid table and when in the up position, the table behind the board can be used by another man, thus economizing space in a crowded drawing room.

Liquid fertilizers are more effective than dry fertilizers because they find their way at once to the roots of the plants. Dry fertilizers laid on or mixed in with the soil must first be dissolved by whatever moisture there is in the soil before they can be taken up by the plants. It is particularly necessary to dissolve phosphates before applying them because they are not as soluble in water as nitrates and other fertilizers.

Instrument dials stay white when sprayed with a new liquid coating formulated with the aid of new resins derived from melamine, now in commercial production. The coating resists the discoloring effects of light, high temperature, chemical fumes and moisture.

Better results in electroplating can be obtained by the use of wetting agents which help to make a better contact between the mold and the liquid. In rinsing plated work, these wetting agents also help to prevent spotting.

Varnish oil is now coming from the jungles of Brazil to offset the present insufficient supply of tung oil. The new oil is prepared from oiticica nuts and like tung oil it dries out, leaving a hard, elastic and durable film. And it sells for 21 cents a pound as compared with 34 cents for tung oil.

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington, D. C., and ask for Gadget Bulletin 80.

Science News Letter, November 22, 1941

HORTICULTURE

High Vitamin C Content In Tomatoes Sought

HIGHER vitamin C content in tomatoes is the goal sought in a unique series of experiments now being conducted by scientists of the U. S. Department of Agriculture. The experiments were described by Dr. E. C. Auchter, chief of the Bureau of Plant Industry, speaking on the General Electric Science Forum.

In one set of tests, tomatoes of known hereditary character are being grown in side-by-side plots at Ithaca, N. Y., on soils brought from all over the United States. The object is to compare effects produced by soil conditions under like conditions of climate. In another set, similar tomatoes are being grown on the soils in their natural locations, which gives a variety of climatic as well as of soil conditions.

Dr. Auchter also told of a new cabbage variety especially rich in vitamin C that has been developed at the Department's breeding laboratory at Charleston, S. C.

Science News Letter, November 22, 1941

Clip and mail this Coupon

To SCIENCE CLUBS OF AMERICA, 1719 N St., N. W., Washington, D. C.

- ☐ Send me information on organizing a science club.
☐ Enroll me as an associate of Science Clubs of America. 25 cents is enclosed.

To SCIENCE NEWS LETTER, 1719 N St., N. W., Washington, D. C.

- ☐ Start my subscription to SCIENCE NEWS LETTER for ☐ 1 year, \$5
☐ Renew ☐ 2 years, \$7
 (No extra postage to anywhere in the world)

To THINGS of Science, 1719 N St., N. W., Washington, D. C.

- ☐ Enter my membership in THINGS for ☐ 6 months, \$2
☐ Renew ☐ 1 year, \$4

Name _____

Street _____

Address _____

City and _____

State _____



Hunted Eagles

EAGLES in Alaska, persistently reported to be in danger of extinction through reckless shooting by bounty hunters, are far from last-stand conditions, Ralph Imler of the U. S. Fish and Wildlife Service states. Mr. Imler, now in Washington, spent the summer in a study of the eagle population along the Alaska coast.

There is no denying that the number of eagles in Alaska has been greatly reduced, he says. How great the reduction has been it is impossible to determine now, for there never was anything like an accurate census of the big birds before 1917, when the bounty system first went into effect. However, even now there is hardly a mile of shoreline without its eagle somewhere in sight.

Alaskan eagles are apparently all of the bald species. Mr. Imler did not see any golden eagles all summer.

The bounty on eagles, established by the Alaska territorial legislature in 1917, is paid on their feet, not their heads. At first, it was 50 cents a pair, but when this did not bring in many eagle feet it was raised to \$1 a pair. At present no bounties are being paid, because the Governor of Alaska vetoed the last appropriation bill. The bounty law itself, however, remains un repealed.

From 1917 to the present, records show, bounties were paid on 110,000 eagles shot, and it is estimated that at least another 100,000 of the great birds have died as a result of wounds, but in such inaccessible places that the hunters could not get at them to cut off their feet.

Several groups have been interested in having eagles killed. Blue fox raisers claim that eagles steal their pups when about half grown. Deer hunters accuse them of preying on fawns. Fisheries

men declare they are voracious fish killers. Finally, there are a good many miners and other men who are quite frankly in the game merely to get the bounty, which supplements their cash incomes during seasons when they are otherwise unoccupied.

The present studies of the Fish and

Wildlife Service are intended to get at the real facts about eagles' food habits. Nobody knows to what extent, if at all, eagles prey upon fox pups and fawns. They certainly eat great quantities of fish—about 80% of their total diet, probably—but most of the fish they eat is picked up along the shore, already dead.

Science News Letter, November 22, 1941

ANTHROPOLOGY

Skeleton With Bulgy Brow Found in Pennsylvania

Discovery of Prehistoric Indian Skeleton in Vault With Stone Lining Draws Scientists to Conference

DISCOVERY of a prehistoric Indian skeleton with narrow, bulgy forehead, buried in a stone-lined vault recently drew scientists from Washington and other cities to a conference in Warren, Pa.

The discoverers tentatively declare that the new-found Pennsylvanian, and another similar burial badly preserved, means that some of ancient America's Hopewell Mound Builders of the Mississippi Valley moved East through the mountains long ago to settle there. Hopewell culture is rated by archaeologists as the highest and most progressive ever achieved by Indians of the eastern United States.

The stone-lined vaults came to light when an expedition of the State Historical Commission was making an archaeological survey of the upper Allegheny valley under leadership of C. E. Schaeffer.

At the session of the Warren County Historical Society called to discuss the finds, support for the theory of ancient Hopewell migration to Pennsylvania was advanced by Dr. T. D. Stewart of the Smithsonian Institution. Having examined the well-preserved skull, Dr. Stewart pronounced it characteristically Hopewell in its narrow forehead with marked bulging curvature. The long, high, vaulted shape of the skull is also Hopewell in type. The Indian, he said, was fairly tall, as Hopewell Indians go, but not beyond the stature range of these Indians.

Objects of mica, galena, copper and other materials which Hopewell Mound Builder Indians were accustomed to use appeared in the Pennsylvania stone vaults. The Hopewell culture is famed

for its wide and distant trade activities for minerals and other materials it wanted. Mica cutouts decked garments. Copper was used in hatchets and personal armor. Galena was admired for its shine.

Science News Letter, November 22, 1941

ETHNOLOGY

Tribal Rule Requires Marriage to Step-Cousin

A STRANGE marriage rule that permits an individual to take as spouse only a step-cousin was described recently by Prof. Alfred L. Kroeber, of the University of California. This complex basis for wedded life was thought up—no one knows why or how—by the Shoshone Indians of the west. It combines the requirement of cousin marriage, prescribed in some primitive groups, with the forbidding of cousin marriage that prevails in others; for the contracting parties, though they call each other cousin, are not blood kindred.

Science News Letter, November 22, 1941

29 Languages by Linguaphone

In your own home you can master SPANISH, PORTUGUESE, FRENCH, RUSSIAN, JAPANESE—any of 29 languages by this amazingly simple, quick, direct conversational method. Used by a million home-study students for business, careers, professions.

Send for FREE Book

LINGUAPHONE INSTITUTE

31 R.C.A. Building

New York City

•First Glances at New Books

NAVIGATION

THE OBSERVER'S BOOK ON MAPS—CHARTS AND PROJECTIONS—William Alexander and W. J. D. Allan—91 p., \$1.25; THE OBSERVER'S BOOK ON ASTRO-NAVIGATION, Part I and II—Francis Chichester—186 p., 2 v., \$1.25 ea., *Chemical Pub. Co.* The first of these three little books acquaints the aviator with the kinds of maps and charts he will use on a long flight, the use of radio direction finding and the symbols used to aid air navigation. It is written especially for the British Royal Air Force. The other two tell the aviator how to find his position by means of the stars, the observations and calculations that must be made, and the instruments that are used.

Science News Letter, November 22, 1941

METEOROLOGY

ON SOLAR - CONSTANT AND ATMOSPHERIC TEMPERATURE CHANGES—Henryk Arctowski—*Smithsonian Institution*, 62 p., 30c. (*Smithsonian Misc. Coll.*, Vol. 101, No. 5). See page 324.

Science News Letter, November 22, 1941

ANTHROPOLOGY

ECONOMICS OF A GUATEMALAN VILLAGE—Charles Wagley—*American Anthropological Association*, 85 p., 90c.

Science News Letter, November 22, 1941

GEOGRAPHY

LABORATORY EXERCISES IN PHYSICAL GEOGRAPHY—M. H. Shearer—*McGraw-Hill*, 139 p., illus., \$1. A workbook for college students, to accompany "The Earth and its Resources" by Finch, Trewartha, and Shearer (reviewed *SNL*, August 30, 1941).

Science News Letter, November 22, 1941

ORNITHOLOGY

WATCHING BIRDS — James Fisher — *Penguin*, 190 p., illus., 25c. Although written by an Englishman and for British birds and environment, the principles on which this handy little manual is built hold good wherever there are birds to watch and persons interested in watching them.

Science News Letter, November 22, 1941

MEDICINE

COMMUNICABLE DISEASE CONTROL, A Volume for the Health Officer and Public Health Nurse—Gaylord W. Anderson and Margaret G. Arnstein—*Macmillan*, 434 p., \$4.25. This should be a very useful book because of its emphasis on and specific directions for practical procedures. Especially helpful, particularly

in view of the limited facilities usually available to health officers and public health nurses, should be the distinction between measures that may be theoretically desirable and those of proved worth.

Science News Letter, November 22, 1941

ETHNOLOGY

AN APACHE LIFE-WAY, The Economic, Social, and Religious Institutions of the Chiricahua Indians — Morris Edward Opler—*Univ. of Chicago Press*, 500 p., illus., \$5. A very successful attempt to make the living habits and thought of a primitive people understandable to readers like ourselves. Mr. Opler's material is the sort that usually goes into anthropology studies, but he has taken unusual pains to bring facts to life, for a wider audience than his fellow scientists.

Science News Letter, November 22, 1941

ASTRONOMY

EARTH, MOON AND PLANETS—Fred L. Whipple—*Blakiston*, 293 p., illus., \$2.50, (*The Harvard Books on Astronomy*). The latest information concerning the planets, together with the manner in which that information has been gathered, is here presented in simple non-technical language. Theories of the origin of the planets and of the moon are weighed and discussed. A planet finder and star chart enable the reader to locate the planets in the sky at any time up to 1970.

Science News Letter, November 22, 1941

ASTRONOMY

THE STORY OF VARIABLE STARS—Leon Campbell and Luigi Jacchia—*Blakiston*, 226 p., \$2.50, (*The Harvard Books on Astronomy*). How the stars change in brightness, the types of variation and the part they play in some of the problems of the universe, are here told with simplicity and clarity. Particularly illuminating are the chapters on red variables and novae, much of the information being of recent origin. The technique of observation is told in detail and will be valuable to amateur astronomers.

Science News Letter, November 22, 1941

PHYSICS

NUCLEAR PHYSICS—Enrico Fermi and others—*Univ. of Penn. Press*, 68 p., 75c. Six valuable papers presented at the University of Pennsylvania Bicentennial Conference.

Science News Letter, November 22, 1941

NUTRITION

WE NEED VITAMINS, WHAT ARE THEY? WHAT DO THEY DO?—Walter H. Eddy and Gessner G. Hawley—*Reinhold*, 102 p., \$1.50. Here is a brief, simply written book for the general reader. It describes each of the known vitamins in alphabetical order, tells its value and sources. A table lists and explains the standard units of vitamin measurement in drugs and foods in the United States today. For the housewife, anxious to provide a vitamin-complete diet for her family, the appendix gives a complete list of foodstuffs and their vitamin story up to the minute, but the authors fail to reflect current medical opinion that drug store vitamin preparations are best left alone by the layman unless he has his physician's prescription.

Science News Letter, November 22, 1941

PHYSICS

DOCTOR WOOD, Modern Wizard of the Laboratory — William Seabrook — *Harcourt, Brace*, 335 p., \$3.75. See page 327.

Science News Letter, November 22, 1941

GEOLOGY

SHIFTINGS OF SEA FLOORS AND COAST LINES — Norman L. Bowen, Joseph A. Cushman and Roy E. Dickerson—*Univ. of Penn. Press*, 30 p., illus., 50c.

Science News Letter, November 22, 1941

GEOPHYSICS

TRANSACTIONS OF AMERICAN GEOPHYSICAL UNION, 1941, Part II — *National Research Council*; Distributed by *Amer. Geophysical Union*, 359 p., \$2.50.

Science News Letter, November 22, 1941

ZOOLOGY

THE PERSONALITY OF ANIMALS — H. Munro Fox—*Penguin*, 123 p., illus., 25c. Entertaining and informative chapters on animal behavior.

Science News Letter, November 22, 1941

ETHNOLOGY

CAMP, CLAN, AND KIN AMONG THE COW CREEK SEMINOLE OF FLORIDA—Alexander Spoehr—*Field Museum of Natural History*, 27 p., 15c. See page 329.

Science News Letter, November 22, 1941

PHYSICS

ATOMS IN ACTION, The World of Creative Physics (Rev. ed.)—George Russell Harrison—*Morrow*, 401 p., \$3.50. An account of the latest scientific discoveries and their contributions to everyday life. The revised edition includes a new chapter, "Science in War and After".

Science News Letter, November 22, 1941